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DRUNKENNESS AND THE WEATHER.

In this paper I have attempted to demonstrate, by empirical methods, certain fixed relations between definite weather conditions and the prevalence of drunkenness in the city of New York. In other words, the influence of the weather as a factor in the cosmical environment upon the prevalence of intoxication. The popular belief that conduct is to an extent influenced by sky, wind and the barometrical conditions is as old as the recorded history of human activities. The literary curiosities of "weather wisdom" are built upon it. Fiction has made full use of it, and there is hardly a modern school teacher who does not attribute certain epidemics of misconduct on the part of her charges, to weather conditions. Although such a belief has been widespread and of long standing, it has contained all the vagaries and contradictions of most popular fancies. Human beings differ so widely, that in weather influences it has been recognized that "what is one man's poison is another man's food," and that some have seemingly been entirely immune to their toxics. In order that a more definite knowledge of these influences might be had, I have undertaken a series of empirical studies in the psychology of the mass, one of which this paper comprises. Others have touched upon the effects of the weather upon the deportment of the pupils in the public schools, of the insane and of the inmates of the New York city penitentiary; upon the prevalence of the crime of assault and battery and of suicide, and upon the death-rate.

All of these crimes and misdemeanors were shown to be

¹ See "Conduct and the Weather;" Monograph Supplement, No. 10; "The Psychological Review;" "The Pedagogical Seminary," April, 1898; "The Scientific American Supplement," June 3, 1899; "Science," August 11, 1899; "Appleton's Popular Science Monthly," September, 1899; "Educational Review," February, 1900; "Nature," February 11, 1900, and "Suicide and the Weather," in an early number of "Popular Science Monthly."

influenced, to a marked extent, by the prevailing meteorological conditions. Seemingly we could almost predict from a look at the sky, the barometer and the thermometer, what the tranquillity of the school room or prison ward would be, or the freedom of the street from brawls and the business of the undertaker.

It is my intention in this paper to discuss only the seeming effect of the weather upon the prevalence of drunkenness, all the other classes of data mentioned above having been treated in articles alluded to in the foot-note.

At first thought there would seem to be very little connection between the prevalence of intoxication and the weather. Most of us can probably not recall a time when it has driven us to drink. Yet the influence of different weather states upon conduct has been proven so great by the other studies alluded to as to warrant some little expectation of positive results, even at the outset of this. With a great many people the occasional debauch is not a matter of mere caprice. It is not even by them a thing to be desired. The pleasures connected with it in no way compensate for the attendant hardships and miseries, both of body and mind. They struggle against it with an intensity unknown to those whose bodies have not been weakened by indulgence, and when the fight is finally lost it is because the allurements of the glass are stronger at the moment than at any previous time during the struggle, or the ability to withstand them less. The weather could not, with any degree of probability, influence the former. It is not beyond the bounds of reason to suppose that it might the latter, through affecting the vitality of the body together with its accompanying mental states, and it is for the purpose of throwing light upon this possibility, with its important bearing upon the drink problem, that the present study was undertaken.

Its exact method is as follows: From the records of the New York city police were copied the number of arrests for drunkenness within the city limits (present borough of Man-

hattan), for each day of the three years 1893-94-95: 63,117 in all. Of this number 44,495 were of males—for the sexes were tabulated separately—and are the only ones here considered. At the New York station of the United States weather bureau were then copied the mean temperature, barometer and humidity, the total movement of the wind, the character of the day, and the precipitation for each of the 1,095 days of those three years. Next, by a somewhat laborious process of tabulation, the exact number of arrests for drunkenness for days falling under each one of the fifty or more definite meteorological conditions shown by the accompanying illustrations, was ascertained. This being done, the average number of such arrests for days falling under each one of those conditions was compared with the normal daily number for the three years, and the excess or deficiency for each meteorological condition graphically shown by the illustration.

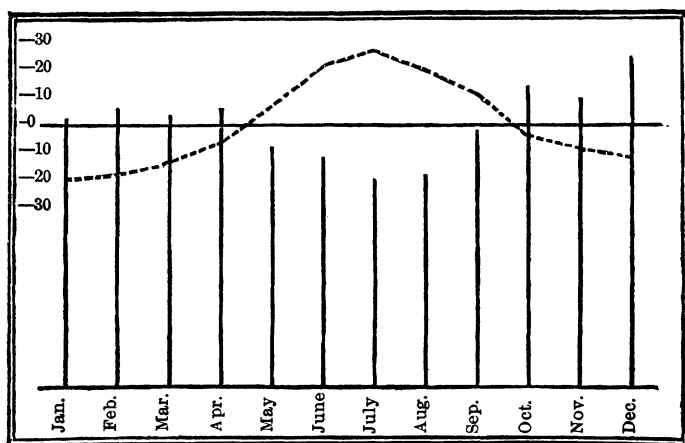
For example: for the three years there were 75 days having a mean temperature somewhere between 50° and 55° (Fahr.). On those same days there were recorded 3,484 arrests for drunkenness, or an average of 46. But the daily average for the three years was only 40.7, showing that drunkenness was excessive for those conditions of temperature. The exact percentage of excess, as shown by the relation between the two numbers, is 15, and is indicated in the proper place upon Fig. 2. This is the plan carried out in the determination of excess or deficiency for every one of the meteorological conditions considered. On each of the figures, the distance from the bottom to the horizontal line represents the normal, the distance from this line to the top of each of the ordinates, the excess or deficiency, which may be read in percentages by means of the scale at the left. The first figure shows the occurrence of drunkenness for the months of the year. A mere glance at it shows the marked peculiarity to be the deficiency for the hot summer months, and a corresponding excess for the colder ones of

winter, there being 47 per cent less for July than for December, with a somewhat gradual change from one to the other. These differences are too great to be ascribed to mere accident, though exactly what their causes may be is somewhat uncertain; in fact, an analysis of the conditions indicates the possibility of at least three. The first is the effect which certain holidays might have upon the occurrence of drunkenness. Undoubtedly some days of the year are made the occasion of a drunken debauch by persons so inclined, and Christmas is one of them. This would tend to increase the number of arrests for December. But the Fourth of July is perhaps just as much of a favorite for such diversion, a fact which would swell the numbers for July. This month, however, fails to show any such effect. In fact, a careful inspection of the daily record of arrests for drunkenness, although showing a slight increase for the festivals mentioned, proves it to be too small to account for the monthly showing. The excesses for the cold months are due to a large daily occurrence, pretty evenly distributed, and the deficiencies for the warm ones to the reverse conditions. Although November shows a considerable excess, I could not tell with certainty by an inspection of the records exactly which was election day, so slight was the increase in the number of arrests for it. It is true that the record for October may be influenced by the fact that the political campaign is at its height, but how much we cannot tell.

Another social condition which may affect the results, is the exit from the city for the summer, of many who are brought with some regularity during the other months, before the bar of the police court. Undoubtedly Coney Island—which was not within the city limits when the data for this study were taken—and many of the other shore-resorts form something of a safety-valve for the New York police during their season, but my study of assault and battery would lead me to believe that the influence of this exodus cannot be great. It would be reasonable to infer

that arrests for these crimes and for drunkenness would be made, for the most part, from the same social stratum, and that social conditions which would affect the prevalence of one of those crimes, would have the same influence upon the other. A moment's thought will be sufficient to show that the summer exit of the frequenters of the up-town clubs would not affect the police courts in the least, for they never get before its bar, no matter how often they are carried home unconscious in a cab. We are dealing only with those who get publicly drunk, and those are the ones who occasionally vary the monotony of a plain drunk with a fight. We could, then, with reason infer that if the public drunkards were gone in any considerable numbers, the public brawlers would be also. Yet this is precisely the reverse of what our study of assault has shown. Upon Fig. 1, I have shown by

FIG. 1.—*Monthly Occurrence.*



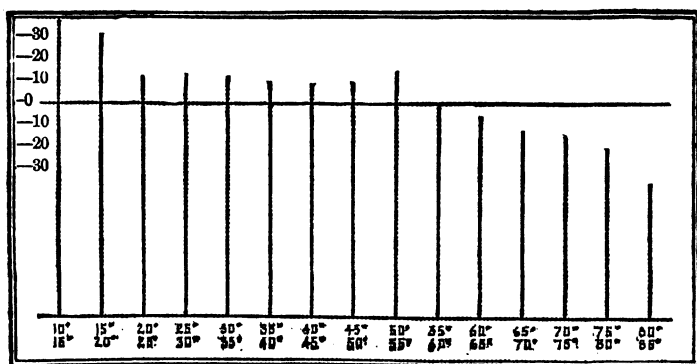
means of a curve in dotted lines, the occurrence of arrests for this crime for the same years. It shows as marked excesses for the warm months as we have deficiencies for drunkenness during that season, a fact which would lessen

the validity of, if not entirely negative the weight of any migration theory which might be brought to bear upon the problem under discussion.

The third hypothesis which might be promulgated is that of the direct influence of the peculiar meteorological conditions, and it seems to be the most plausible. Since, however, the remainder of this paper is made up of a discussion of these conditions, I will simply state here that the prevailing ones for the summer months for New York City are high temperatures, barometer and humidity slightly below normal, light winds and generally fair weather.

Temperature.—Fig. 2 shows in a very marked manner, a

FIG. 2.—*Temperature.*



seeming effect of differing conditions of temperature upon drunkenness. In explanation of it I would say that the exact relation between expectancy and occurrence was worked out for each of the temperature groups indicated at the bottom, and this relation shown for each group by the height of the ordinate above. Low temperatures made business for the police courts, and high ones lessened its labors. Of course, if our conclusions in the preceding paragraph on occurrence were erroneous and the deficiency in drunken-

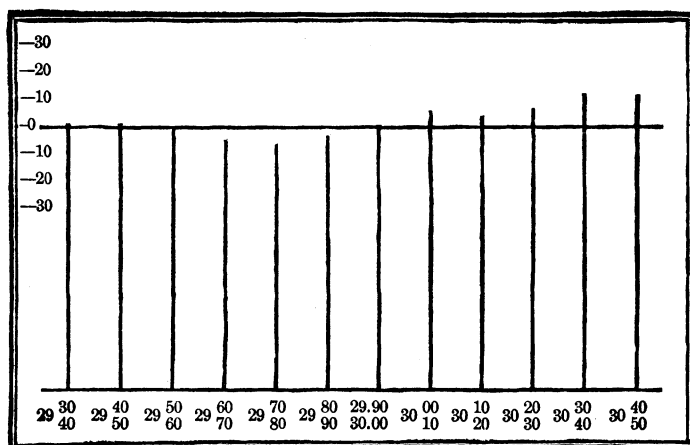
ness for the summer months was due to social, rather than meteorological influences, conclusions drawn from this figure would also be false. In that case, deficiencies for high temperatures shown here would be but concomitant variations. The summer is hot. If there be but few arrests for drunkenness during the summer, there can be but few for high temperatures. On the other hand, if high temperatures so affect the individual that less stimulant is desired than during those which are lower, we have here the cause of the peculiarities shown in Fig. 1. There are some reasons for believing that this is the case. In the first place, my other studies of weather effects have seemed to show that during moderately high temperatures the vitality of the body is relatively excessive, while for low temperatures it is deficient. These facts in themselves would affect the demand for stimulant. A "bracer" is taken when *needed*, and for many a "bracer" means a "drunk." We may, I believe, with justice conclude that many of the habitués of the police court as prisoners, struggle against their tendencies to drink, knowing the consequences. When vitality is excessive, they do so with success, for days and, perhaps, for weeks they are winners, but finally the time comes when the fight is too severe, and they succumb. That was on the day when vitality was at its lowest ebb, and the cold contributed to that condition. A few glasses of whiskey would remedy all that, and it did so. What cared the poor fellow what Arctic explorers have said about the effect of alcohol upon the system in the long run? He was cold; he was weak. The stimulant would give him immediate, though temporary, relief. He took it and our figure shows the result.

Perhaps another influence of different temperatures shown by our figure is through the kind of alcoholic beverage used. In hot weather a man drinks beer; in cold, whiskey. During the former conditions of temperature, the body demands large quantities of liquid, which, through the secretions of the skin and attendant evaporation, may reduce

the body temperature. Beer meets this requirement, and at the same time furnishes alcoholic stimulant, yet in quantities so small as to intoxicate only when taken inordinately. Yet, if our theory is correct, the condition of vitality is such that even this small amount more nearly meets the demands of the body than during the cold season, and consequent drunkenness is less frequent.

Barometer.—The facts shown by Fig. 3 are not so conclu-

FIG. 3.—*Barometer.*

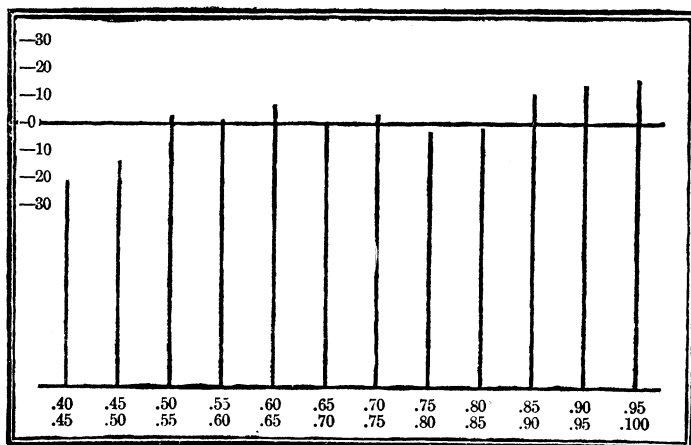


sive as the preceding. In it we have the prevalence of drunkenness for different conditions of the barometer. To generalize from it we may say that the excesses were for high readings of that instrument. It is not easy, with our present knowledge, to account for this. Both high and low conditions of the barometer are distributed pretty evenly throughout the year, so we cannot attribute it to any effect of the season. It is possible that it may be due to the effect of storms upon the vitality of the body, and the consequent demand for stimulant. The barometer is not normally high during periods of bad weather, but usually follows them pretty closely with a rise, and it may be that although the

“bracer” has been struggled against during the prevalence of a storm, at its close bodily conditions are such that the fight is given up, and a debauch follows. It is certain that the actual weight of the atmosphere, as indicated by the barometer, is not the influencing factor. The entire variation in the height of the mercury column for New York City is but little more than an inch, while in going to an altitude like that of Denver, Colo., a change of more than five times that amount is experienced without any noticeable influence upon conduct. The showing for this figure must, we think, be due to other weather conditions which vary with the barometer, yet what they are cannot be said with certainty. We may add that the seeming effect of different barometrical conditions upon the tendency to drink, is exactly the opposite of that upon the occurrence of misdemeanors in the public schools and penitentiary, of arrests for assault and battery and of suicide.

Humidity.—The fluctuations in the height of the ordinates upon Fig. 4, which shows the relation between drunk-

FIG 4.—*Humidity.*



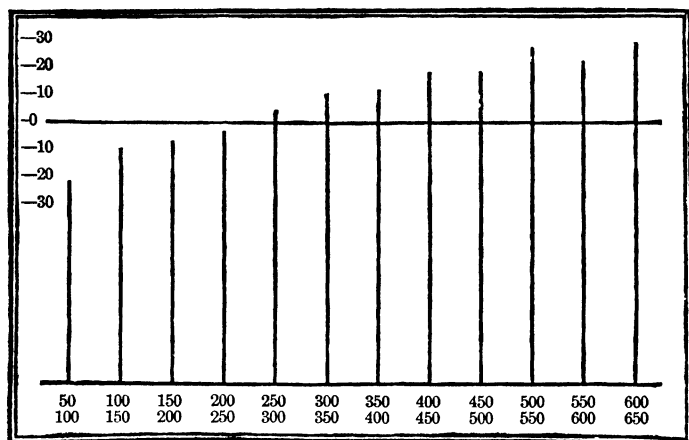
eness and varying conditions of humidity, is very great; so much so as to make the curve a hard one to interpret. We have there shown, not only excesses in the number of arrests during high humidities (*i. e.*, during much moisture), but also during those which are lower than the normal. Yet in spite of its circumflexion, the general showing of the curve is an increase of drunkenness with an increase of humidity. This might with reason be expected. First, the seeming temperature of a cold day in winter is much lower when the humidity is great than when it is small, necessitating, perhaps, more stimulant to keep up the proper vitality under the former conditions than under the latter. Second, on a day on which the humidity is great in summer, evaporation from the surface of the body is less rapid, and, as a consequence, beer, the ordinary summer beverage, loses to an extent its cooling properties. A logical inference would be that less would be drunk with the consequent effect upon the prevalence of drunkenness.

Beside these hypotheses based upon the relation between humidity and temperature, is one having to do more directly with that between the former conditions and the vitality of the body. The studies of weather-effects already alluded to have seemed to show beyond a doubt that vitality is greatest during weather states of small humidity. At such times, the death-rate is lower, and disorder of an active nature more prevalent. My studies have shown that then the electrical potential of the atmosphere is higher—itsself a stimulant without being an intoxicant—with the natural effect that less alcohol is needed, with the lessened danger of the police court.

Wind.—Fig. 5, with its row of ordinates regularly increasing in height, argues strongly that high winds are among the saloon keeper's best friends. The numbers beneath the individual figures show the total number of miles the wind blew for the days which, grouped, give the results shown graphically above.

From a deficiency of 23 per cent for conditions of practical calm, to an excess of 50 per cent for wind the velocity of a hurricane, the increase is very regular. In referring conditions of wind to those of temperature. the same can be

FIG. 5.—*Wind.*

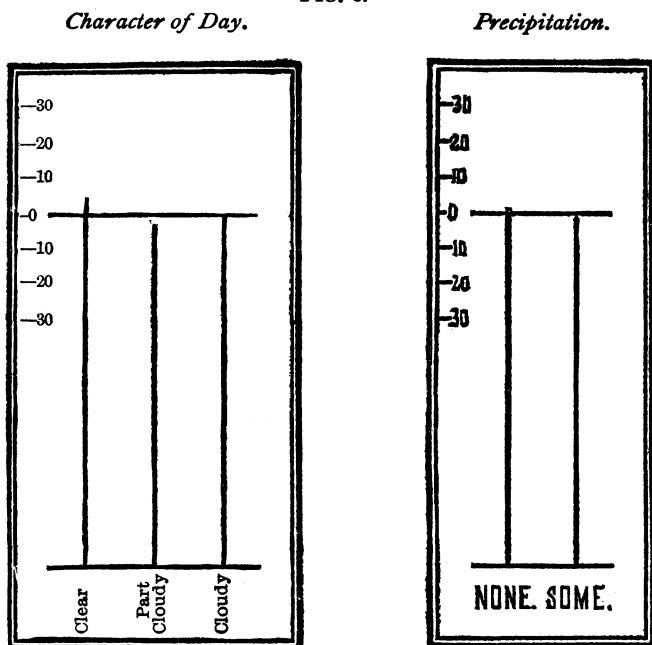


said in part for high winds that was for great humidities, namely, that they intensify the effects of cold. The effect of great heat is, however, usually modified by a movement of air, although evaporation from the surface of the body is augmented, and the demand for liquid refreshments increased. This latter fact would swell the consumption of beer at such times. Our figure seems to show that such is the case.

Upon Fig. 6 are shown the relative numbers of arrests for drunkenness upon days characterized by the United States Weather Bureau as "clear," "partly cloudy" and "cloudy." As so characterized, clear days are those upon which the sun is obscured for three-tenths or less of the time from sunrise to sunset. As partly cloudy when from four-tenths to seven-tenths (inclusive) of that time is obscured,

and as cloudy when more than that amount. Under precipitation, I have contrasted those days upon which there was rain or snow-fall in excess of .01 in. with those on which there was none, without taking into consideration the amount.

FIG. 6.



Considering the influence of some of the other meteorological conditions, as temperature and wind, the effect of these most noticeable differences in weather seems very slight. In fact, so slight as to come within the computed "probable error," and perhaps can only be taken as negative results. Such as they are too, they are contrary to what we should expect from a study of the other conditions and to our line of reasoning. The other conditions show excesses of drunkenness for debilitating weather states, and deficiencies for

those which are exhilarating. Here we have the reverse, for clear and dry days which are bracing give us excesses, though very slight ones, while partly cloudy and wet days show deficiencies. Cloudy days furnish exactly the normal number.

It is hardly worth while, however, to attempt to account for these anomalies since they are so small as to come within the probable error, and may or may not mean anything at all.

In conclusion, I would say that I recognize the limitations of this method of study. By its very nature each meteorological condition is treated as if the others were not at the same time potent. This fact would introduce no error unless two or more tended to vary simultaneously. In that case the effects of one might be imputed to another. If all tended to vary without fixed relation to one another the showing for each would be valid, and a careful study of weather fluctuations seems to show that this is largely the case. We recognize, too, that a study of drunkenness does not have quite the bearing upon the liquor question that one based upon the consumption of stimulants, as influenced by weather conditions, would have. We have argued that the latter affect to a recognizable degree the vitality of the body, and that deficiencies are compensated for by the use of alcohol in some of its forms. But in studying drunkenness we are missing entirely all those whose "bracers" did not lead on to a debauch. Where the feeling of depleted vitality led one man to the police court it probably led a hundred others to the sideboard or to the saloon for a drink, but of these we know nothing. It may be possible at some future time to base a study similar to this upon the daily output of some large city saloons, with striking results.

Certain it is that the great drink problem cannot be solved without having more scientific light thrown upon the psychophysiology of the mass. As long as people demand stimulant it will be obtainable. Lessen the demand and the

attendant suffering will keep pace with its decrease. We cannot hope to alter prevailing meteorological conditions were we convinced of their direct bearing upon the problem, but we can lessen their influence by shielding the unfortunate from their rigors, and by increasing in every possible way the normal vitality of the class which most needs it.

Who can say how largely the drink problem is one of better heated tenements, of warmer overcoats and of more nourishing food !

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